Sex Differences in Hip Muscle Strength in Patients with Femoroacetabular Impingement Syndrome

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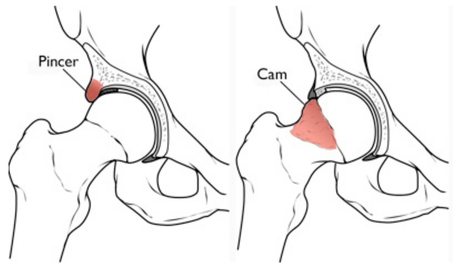
Background

- Femoroacetabular impingement syndrome (FAIS) is a debilitating musculoskeletal condition that can cause hip pain and weakness, functional disability, and eventually osteoarthritis[1,4]



Pictured above are the two types of bony lesions
Illustration by the American Orthopaedic Society for Sports Medicine

- Women with FAI have demonstrated poorer function both pre- and postoperatively compared to men;[2,3,5] however, it is unclear what impairments may have contributed to these discrepancies.

Purpose: To investigate sex differences in hip strength for persons who have undergone hip arthroscopy for symptomatic FAIS. We tested the hypotheses that:

1) Women would have significantly lower hip strength after surgery
2) The involved limb would be weaker than the uninvolved limb, regardless of sex

Methods

Demographics | *Mean ± standard deviation*

	Males	Females	P =
N	12	13	-
Age (y)	28 ± 11	22 ± 11	0.225
BMI (kg/m^2)	25 ± 3	25 ± 5	0.774

Sports Participation Level at Testing

	Males (%)	Females (%)
Level 1	25	15
Level 2	25	0
Level 3	42	62
Level 4	8	23

Methods, Cont.

Prospective, Longitudinal Cohort Study

- Bilateral hip strength was assessed six months post arthroscopy
- Maximum voluntary isometric contraction (MVIC) was measured in side-lying position for:
  - Abduction
  - External rotation

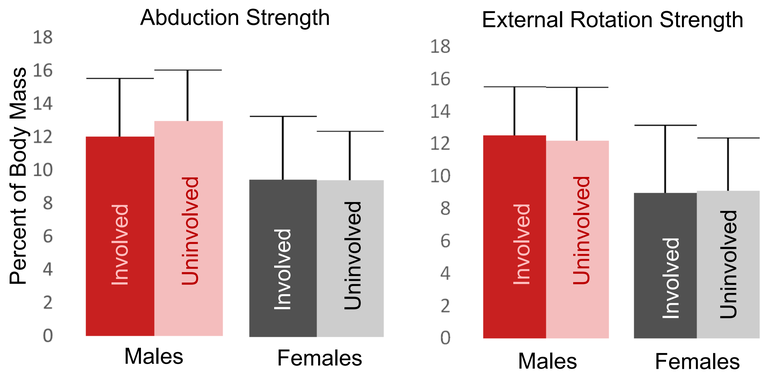
Hip Strength Testing Positions

- Strength was normalized to body mass and limb averages were calculated

Statistical Analysis

- A two-way ANOVA with post-hoc t-tests were performed to investigate sex and limb differences in normalized strength ($P<0.05$)

Results



- There was no significant interaction of limb by sex ($P=0.30$) or significant effect of limb ($P=0.347$)
- There was a significant main effect of sex ($P\leq0.03$) for hip abduction and external rotation strength
- Women demonstrated significantly lower normalized strength for both hip abduction and external rotation ($P<0.002$)

Results, Cont.

Strength by sex, regardless of limb | *Mean ± standard deviation*

Normalized strength represented as percent of body mass

	Males	Females	P =
Abduction	12.5 ± 3.3	9.4 ± 3.4	0.002
External Rotation	12.3 ± 3.1	9.0 ± 3.7	0.001

Discussion

- Our study supports our hypothesis that women have significantly lower hip strength than men after surgery.
- Strength deficits of the involved limb compared to the uninvolved limb were not identified in this cohort.
- These results may be due to a limitation of the methods used to assess muscle strength or the inclusion of only two major hip muscle groups.
- Other limitations include:
  - Small number of patients
  - Strength only measured in side-lying position
- Gaining a greater understanding of potential sex differences in strength will better equip clinicians to provide treatment to prevent functional deficits.
- Future studies should use larger groups of participants and evaluate other major muscle groups of the hip, which are commonly associated with FAI.

Acknowledgements

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References

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